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SCIPS I-VI H

December 1963

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THE PHOTINT INFORMATION

PROCESSING WORLD

STAGE I REPORT
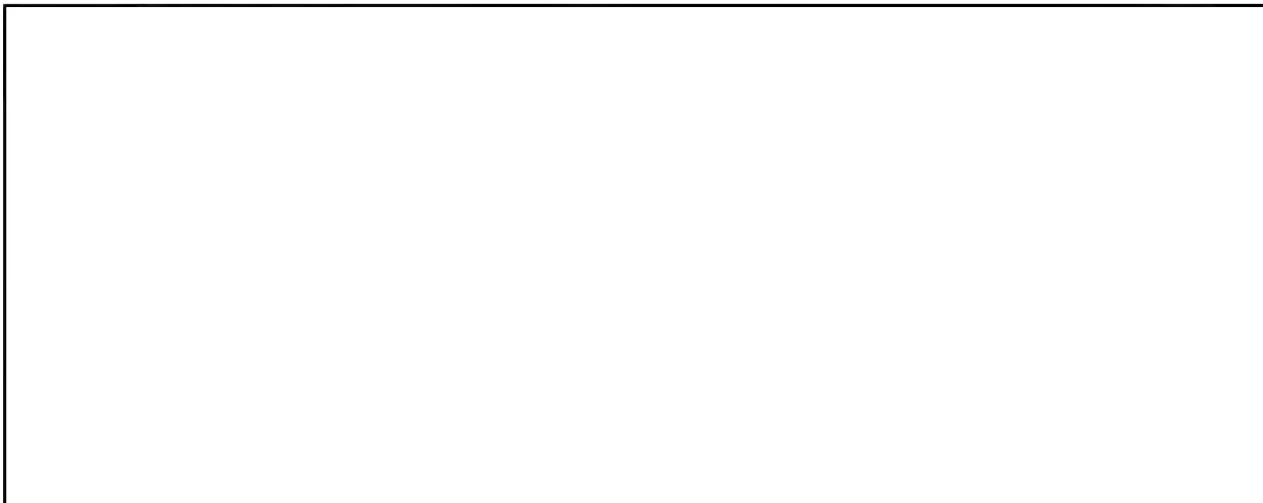
VOLUME VI

APPENDIX H

Staff for the Community Information Processing Study

(SCIPS)

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THE PHOTINT INFORMATION

PROCESSING WORLD

STAGE I REPORT

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SCIPS I-VI H

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Staff for the Community Information Processing Study

(SCIPS)

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STAFF FOR THE COMMUNITY INFORMATION PROCESSING STUDY

(SCIPS)

LETTER OF TRANSMITTAL

SCIPS D-2/3/S
18 October 1963

MEMORANDUM FOR:	Chairman, United States Intelligence Board
THROUGH	: Chairman, Committee on Documentation, United States Intelligence Board
SUBJECT	: Transmittal of Stage 1 Report, Volume VI
REFERENCE	: (a) CODIB-D-82/9 and USIB-D-39.7/1, 24 July 1961, (Terms of Reference)
	(b) CODIB-D-82/16 and USIB-D-39.7/3, 23 February 1962, (Stage I Plan)
	(c) USIB M-202, 28 February 1962

Transmitted herewith, in accordance with references and supplementing my memo of 17 October 1963, is Volume VI of the SCIPS Stage 1 Report.

The National Photographic Interpretation Center is due a vote of thanks for its fine work and effort in publishing this volume on behalf of SCIPS/CODIB.

Director/SCIPS

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ILLUSTRATIONS

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I. FOREWORD

This volume, No V1 of the SCIPS Stage I Report, consists solely of Appendix H, "The Photint Information Processing World." Although published separately for dissemination control purposes, Appendix H is nominally an integral part of Section III, "Findings and Discussion," contained in Volume II of the Stage I Report. However, this appendix is an entity in terms of findings, discussion, conclusions, and recommendations inasmuch as survey and analysis were conducted on a limited world basis, similar to Appendix F on the Foreign Publications World, and not on the all-worlds basis used for other parts of the Stage 1 Report. Because of this, Appendix H does not include the collateral materials portion of the PHOTINT world, but only that which is within the T-KH System.

SCOPE NOTE

This study includes most of the large organizations performing information processing within the TALENT-KEYHOLE (T-KH) System. The most important domestic organization which was not surveyed was the USAF Aeronautical Chart and Information Center. Other Scope Notes on depth given in Volume I and II of the Stage I Report are applicable to this Appendix.

The T-KII System was created to provide intelligence exploitation of photography obtained by methods which must be guarded by the strictest possible security measures. It is, therefore, a rather small group of organizations and people who are processing information in a separate, identifiable, and somewhat integrated system within the total community information processing system as visualized in the SCIPS Terms of Reference. Survey-wise, SCIPS experienced fewer access problems than were experienced in the SIGINT and Clandestine Services areas.

Unfortunately, time and clearance problems prevented the machining of this portion of the SCIPS data base, and as a result, there is less quantitative data included in this Appendix. The analysis phase likewise suffered. Thus, although the analysis of the T-KII world for the Stage I report was necessarily more subjective and individual, it is included as a basis for further work.

II. INTRODUCTION

The T-KH System is probably ahead of most of the intelligence community in the application of up-to-date information processing (IP) methods. Among the causes of this can be listed:

a. The System is relatively new, dating back only to 1956, and therefore has had the advantage of new techniques in information processing since its inception. There were no great holdings of stored information which had to be maintained in old ways or converted to new.

b. Faced with the necessity of exploiting large masses of photography, and of combining and comparing it with intelligence from other sources, the T-KH System was forced to improve on information processes by whatever means were possible.

c. Perhaps because the source and system were new, supervisors and most employees have encouraged and adjusted readily to new, improved techniques or innovations.

d. The System consists of a small group

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of relatively close-knit organizations which tend to share ideas and developments readily.

e. Funds have been available to the System organizations to buy or lease computers and other expensive information handling equipment capable of improving processes.

Despite these advantages, however, problems have arisen. The System organizations have tackled their problems and in many cases are approaching a solution. In some other cases, they have so far failed to properly identify their problems.

Because of the unique advantages the System enjoys, if it can solve its own problems and develop within its own boundaries information processes which are truly efficient, it might serve as a model for the rest of the intelligence community.

III. FINDINGS AND DISCUSSION

A. PICTURE OF PRESENT INFORMATION PROCESSING

1. Organizations, People, and Equipment

a. Organizations

Although there has been some reorganization and consolidation since the field survey was conducted, the 13 organizational units studied are shown in Figure H1 as well as the relative size of those organizations in terms of number of personnel. Also shown in Figure H1 is the Navy Photo Interpretation Center which was not surveyed, but was visited during the course of the study. The subsequent consolidation of the 13 organizations into 10 is indicated on the chart. There are some 30 other organizational elements which comprise the T-KH System. These are shown in Figure H2. A complete study of the system would require a look at the processing in all these organizations. As in the case with collateral organizations, the major central elements were selected for study in Stage 1. Whereas it is estimated that Stage I coverage represents only 30% of the original scope for collateral organizations, it is estimated that Stage 1 coverage of T-KH activities represents perhaps 50-60% of the needed scope.

b. People

The total number of personnel in the organizations surveyed in ☐ The allocation of these people by organization is indicated in Figure H1 by the size of circle. As can be seen, the three largest elements are the National Photographic Interpretation Center (NPIC), the Army Map Service (AMS/DESPA), and the Strategic Air Command (SAC). Following the reorganization, the Defense Intelligence Agency (DIA), including six of the surveyed organizations, is among the largest ☐ persons. (Only part of the Army detachment of NPIC went to DIA.)

As in the case of language translators (analysts) in the "Pubint" world (see Appendix F), the photo interpreters (analysts) are included in the information processing personnel picture.

c. Equipment

In addition to the equipment usually found in the other information processing organizations, there is a large amount of special equipment designed and used for photographic interpretation. This special equipment ranges from the simplest viewer to very sophisticated mensuration equipment employing the best available optics and electronics. (See Attachment A for a

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comprehensive list of equipment.) Even so, virtually all the equipment other than photo developing serves as an aid to a human photo interpreter; no system of automatic pattern recognition was found.

The exploitation equipment in use within the System is fairly well standardized. This has been achieved by close coordination among the organizations in their purchases, testing, research and development of equipment. Richardson projection viewers, light tables, and stereo microscopes are common to all. Photogrammetric instruments vary as to makes and models but not too much as to capabilities. This is also true of photo laboratory equipment. Although much has been tried and great sums of money have been spent, there is nothing startling in the way of exploitation equipment presently in use in the System. A breakthrough does appear imminent, however, in the development of high-quality film chips. One vast improvement in exploitation techniques has occurred in the general acceptance of film, rather than paper prints, as a viewing medium. This has given rise to the use of projection viewers and microscopes.

In contrast to the relatively standardized development and application of exploitation equipment is the variety of automatic data processing applications in T-KH System organizations. Three Air Force units surveyed had somewhat parallel developments under AF Project 438L, and each had an IBM 7090 computer available. These computers are outside T-KH areas and are "secured" on an ad hoc basis when system material is being processed. NPIC has three computers, a Univac 490, an IBM 1401 and a Minicard. The Univac 490 system is being developed as a highly sophisticated tool for providing on-line accurate measurements to photo interpreters from remote inquiry stations within the NPIC Building. The 490 is also being developed for other scientific

applications which it will handle simultaneously with the PI-assistance computations. The I401 is being used for information storage, report writing, and administrative functions. Minicard is being used for storage and retrieval of PI reports. Three of the other organizations surveyed have computers which are available to them for limited use, outside of the secured area but within their building. These are AMS (Honeywell 800), CIA (IBM 1410 and now a 7090) and NAV PIC (various). (An inventory of equipment for organizations surveyed is contained as Attachment A to this Appendix.)

2. Items

The reporting process within the T-KH System has developed into a rather regular pattern.

a. Early Reporting

NPIC produces immediate reports, OAKs, IPIRs (Immediate Photo Interpretation Reports), etc., which are the result of quick scans of new photography for highest priority targets.

NPIC later produces an MCI (Mission Coverage Index) which is a summary of all significant targets found on a new mission. The MCI takes about one month to produce. The SAC PRI (Photo Reconnaissance Index) covers about the same ground as the NPIC MCI, but presents its findings in a more codified and tabulated form. It is produced much quicker than the MCI. These three report series account for most of the systematic early reporting of the results of new missions.

b. Special Reporting

After the early exploitation, each organization further exploits the photography according to its own mission. Very briefly, this results in the following types of products:

(1) NPIC answers requirements from USIB agencies for specific reports on items of

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national priority interest. These are usually formal reports and receive rather wide dissemination.

(2) Air Force units exploit the photography primarily in three ways:

(a) By recording all targets, or changes to existing targets, found on the photography in the Aerospace Intelligence File (AIF) and then by obtaining special listings, one of which is the Target Data Inventory (TDI), from this computerized file. This, incidentally, is a most important way in which information from T-KH material is reported out of the System. (The TDI is SECRET.) The AIF is a large machine file containing formatted information on over 100,000 installations.

(b) By making up Unifile PI reports. These reports give photo-derived information on targets in a highly formatted style. Also, the information can be readily converted to machine language and can be stored. In some cases textual and graphical information are added to the formatted information and the result is disseminated throughout the System as a report. Most traffic in these reports, however, occurs between Air Force units, and between SAC and AFIC (now DIA).

(c) By updating Air Target Materials.

(3) Army's main effort, other than its contributions to NPIC and DIA, is the mapping program carried out by AMS. Under this program the Soviet Union is being mapped at a scale of 1:250,000 with KH photography. An Army detachment at NPIC also turns out Photo Intelligence Reports for Army departmental interests. These are in answer to specific and standing requirements from Army elements.

(4) Navy PIC produces quick-response reports in answer to requests from Navy components. It also updates the Air Target Material Program by use of T-KH photography.

(5) The CIA Detachment in NPIC produces quick-response reports in answer to requests from CIA components. These responses are usually directed to the requestor only.

c. Briefing

Briefings and briefing aids probably play a larger role in the promulgation of intelligence within the T-KH System than in any other portion of the USIB Community. With each new mission a series of large annotated photographic briefing boards are made on highest priority to show the most significant items found on the film. These boards are used to brief the highest interested echelons of government. Vu-graph slides of these boards are made and distributed immediately throughout the System. These slides are used by recipients to brief their chiefs. Thus, very early after each new mission the most important findings are presented directly to those elements of government most capable of taking action. As exploitation continues and new items of importance are discovered, these too are worked into briefing aids by NPIC or other System organizations. These often provide the first notice of new findings.

d. Other Items

The other principal items are: (1) the raw film itself in both duplicate positive (DP) and duplicate negative (DN) form, (2) large prints of selected frames produced locally for analysts, (3) nearly all the items that are produced in the other worlds, e.g., COMINT, HUMINT. These

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materials show up in one or more of the T-KH System organizations.

3. Flows

Insufficient analysis has been made of the survey data to present an overall flow picture. What would be particularly valuable would be the flow of non-T-KH material to the T-KH organizations. However, this flow is indirectly indicated by the file holdings discussed in Section 5, below.

Flow within the T-KH community itself is pretty well confined to the photographic film and the items indicated in Section 2, preceding. For non-T-KH material, i.e., collateral, each of the T-KH elements indicated in Figure H2 depends upon its parent department for support. Thus, as shown in Figure III-n (20) in volume II of this report, the flow of collateral items to NPIC is

almost entirely from CIA, and in particular from the Document Division of OCR. This Appendix shows the flow of T-KH film and the OAK reports. Figures H3, H4, H5, H6, and H7 show the flow of photographic film items of the various series, respectively: ⬜ **25X1**
photography; KEYHOLE; BRASS KNOB (Cuban photography is now out of the T-KH classification); Far East TALENT film; and Penetration film. As can be seen in these five figures, the philosophy is one of broad dissemination of the raw take in multiple copies. This is another manifestation of the policy of "free exchange" of information, but there is no evidence of responsibility for information support. The volume of dissemination of each of these series is, of course, very variable, but for the period under survey the approximate annual volumes were as follows:

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There are ten principal recipients of the raw take, and virtually no discrimination is made in the initial dissemination. In fact, dissemination is really made before content is known (other than by predicted coverage calculations) and with little regard for content. The furnishing of duplicate positives (DP) is for photo interpretation and scanning purposes, whereas duplicate negatives (DN) are used to make additional copies and selected prints.

Figure H8 shows the standard distribution of the OAK reports. The flow pattern is typical

for other early photo intelligence reports produced by NPIC. As can be seen here, the Special Activities Office in DIA has become a major focal point for dissemination to military departments which consume some 48 of the 60 copies disseminated. This is in contrast to the simultaneous direct distribution of raw data from the processing site.

As shown in the charts, movement is quite free and voluminous between organizations in the community. Film goes to all organizations with exploitation capabilities. Generally speaking,

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reports go to all organizations. The main exception occurs in the case of reports made for internal departmental consumption. These seldom get disseminated, nor is their existence generally known to other System organizations.

4. Processes

a. General

The requirements for the initial readout of photographic missions performed by NPIC come from the Committee on Overhead Reconnaissance (COMOR). This USIB committee establishes priorities for targets according to their bearing on national intelligence. The immediate reports (OAKs, IPIRs, etc.) report on the highest priority COMOR targets.

Requirements for detailed reporting by NPIC go through a rather complicated cycle. The initiator sends his requirement through his own agency's requirement channels to the Secretariat of NPIC's Advisory Committee (AdCOM). The Advisory Committee consists of members from all interested USIB agencies. The AdCOM's Secretariat consists of members from DIA, CIA, Army, and NSA stationed at NPIC. It decides whether a requirement is of national or departmental interest. If national, it is sent to the AdCom for a priority recommendation. Then it can be accepted for work by NPIC. If the Secretariat decides it is only of departmental interest, it will be sent to one of the departments to be answered. Departments with a photo interpretation capability accept requirements from their own components and work on them without reference to the AdCOM or to NPIC unless they consider them of national interest.

b. Processes by Organizations

Eleven kinds of processing that occur in the 13 organizations surveyed (plus NAV PIC) are

shown in Figure H9. This figure is not statistically based on the number of people or amount of floor space devoted to each process. Rather, Figure H9 is a graphic presentation, organization by organization, of the proportion of that organization's mission or total effort devoted to each process as "judged" by the surveyor. It is believed that the relative proportions are sufficiently valid to give a picture of the primary functions of each of the organizations. Thus, AMS/DESPA's main effort is to produce maps and charts from T-KH raw material. The CIA detachment at NPIC is primarily doing photo interpretation work, whereas SAO/DIA's function is primarily coordination and dissemination control. The relative size of the circles in Figure H9, show where most of each of the major processes is performed. The relative degree of centralization of those processes is as follows:

(1) Photo interpretation - primarily by NPIC detachments and SAC.
(2) Mapping and charting - AMS/DESPA (ACIC not surveyed)
(3) Textual reference services - all
(4) Photo reference service - all
(5) Automatic data processing - NPIC, SAC, FTD, AFIC

It can also be seen by the variety and even distribution of the processes that there are organizations which are relatively autonomous or are complete centers in the sense of performing all or nearly all processes: NPIC, SAC, AFIC, and NAV PIC.

c. Storage and Retrieval

Storage and retrieval of information within the System varies from completely manual in the case of AAIA, to highly automated as in the case of AF Urifile and a computer-assist system in NPIC. The Unifile Photo Interpretation Report System (UPIR), now centered in DIA, employs a standard reporting form from the various Air

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Force photo exploitation units. The UPIR system employs two formats to report information derived by photo analysis on each installation. The UPIR-1 provides for filing and controlling data such as: target identification; mission and frame identification; evaluation of quality of the photo coverage; specific, derivable installation characteristics and conditions; and a free field for pertinent remarks. The UPIR-2 provides for narrative discussion of the target, interpretations, and other pertinent information which is not susceptible to or appropriate for rigid formatting.

Upon completion, the UPIR-1 is ready for key punch without additional intermediate processing. It is then entered into the UPIR magnetic tape file and is available for machine processing and production. The UPIR-2 is stored for retrieval in document form in the MINICARD system.

The system in NPIC is centered around the Target Brief File. Reports from all sources, not just photography, are read and analyzed to contribute to this file, but only evaluated extracts or abstracts are introduced into the file. The important features here are that analysis occurs before entry into the machined data base and is done manually by the people constructing the data base from all sources including photography. Information is accepted or rejected on the basis of its use in adding to or correcting the data base. The information is entered into the data base in narrative form as contrasted with Unifile which is highly structured and rigidly formatted; however, both computer files are target oriented.

The NPIC Target Brief File was developed as a tool for photo interpreters. When raw information from a new mission is obtained, the pertinent portions of the Target Brief File are printed out by the computer, roughly in the order that the photo interpreter finds them as he scans

the photography. He compares the new photography of a target with the target brief statement of what is already known about it and has to identify and record only the variations. New photographic coverage data, new targets, and changes to the previous targets discovered on the photography are added to the target brief in the machined data base, so that it contains references to all previous coverage. The system does not provide ad hoc query service nor is there the pertinance of retrieval that a formatted file would provide. However, the narrative description has its appeal and unique utility, and the system does serve its original purpose of assisting read-out of new photography, and, it is believed, it could serve other broader purposes also.

5. Files

a. General

In the T-KH System there are two types of files, the reconnaissance film files and the non-film files which will be called information files. The information files are about as varied as those discussed in the main body of this report. Their unit records consist of cards, documents, tape records, etc. The photographic files, however, are quite uniform throughout the System. Almost universally these files consist of rolls of film, either positives or negatives, which are stored in cans. The unit records for these files are the individual frames (or exposures). Considering all types of film, there are roughly 100 unit records (frames) per roll of film.

b. Total Files and File Size

A total of 95 information files were identified within the 13 T-KH System organizations studied during this survey. This compares with 926 files identified within 43 organizations surveyed outside the T-KH System. In number of

files, then, the T-KH files represent about one tenth of the files surveyed. In terms of items filed, however, the T-KH information files show only 2,600,000 items as compared with over 220 million for all organizations, or roughly 1/100th of the total, which reflects the smaller average file size within the System. This is as expected because of the relative age of files. Figure H10 is a graphical presentation of the size and organizational distribution of information files in the surveyed organizations.

Twelve film files were studied during the survey. Six of these contained roll film and six contained cut film or prints. The six roll film files contained 73,000 rolls of film or approximately 7,300,000 unit records (frames). The table in the Flows Section, above, shows that there are, however, an average of some 25 copies issued, of which about 15 go to the organizations surveyed in Stage 1. The six cut film files contained 100,400 unit records. Figure H11 is a graphical presentation of the six roll film files. Combining information and film files gives a total of 117 files and approximately 10 million unit records or roughly 5% of all unit records surveyed during Stage I.

c. Age and Growth of Files

All files in the T-KH System are relatively young. The oldest date back only to 1956. Some of the larger files within the System were less than one year old at the time of the survey. In these files the annual growth rate is more significant than the present size of the file (see Figure H10). The average annual growth rate of the T-KH information files is 60% of the present size of the file. This compares with an annual growth rate of 15% for files outside the T-KH System. This great difference can be explained in part, of course, by the fact that an addition to a small file will show as a much larger percentage gain than the same addition to a large file.

The annual growth rate of the roll film files presents an even more alarming picture. There were 33,000 rolls of film accessioned by these six files during the last 12-month period recorded by the survey. This represents approximately 3,300,000 exposures, or 47% of the total present holdings. Although the percentage figure is smaller than that of the information file growth, the pinch caused by the film file growth is much more severe. This is because the absolute growth is far greater, and the bulk represented by a frame of film is far greater, than that of the average unit record of the information files which include such minuscule units as tape records and minicards. The storage capacity of the six roll film files studied is already seriously taxed, and the prospect of doubling every two years is not comforting. It should be pointed out, however, that the 33,000 rolls of annual growth and the 73,000 rolls of total holdings represent much film duplication. Each of the six files surveyed is largely duplicative of the others, and within a given file there is further duplication, both between passes and missions and multiple copies of the same reel. An estimate of the original negatives within these files is 5,000 rolls or about 500,000 frames. All the rest are duplicates of these. Similarly, the annual growth of original negatives would be about 2,400 rolls or 240,000 frames. The annual growth of all original negatives in the T-KH System, both in those organizations studied and those not studied, is projected to be 4,660 rolls or about 540,000 frames.

d. Purge Criteria

Most (79 files) of the information files surveyed showed no purging at all. Of the files that were purged, the most common criteria were supercession (20 files) and correction (15 files). Only one, the NPIC Target Brief File, used evaluation as its purge criterion.

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There is almost no purging of the film files. In cases where the film is originally lower than the T-KH security level or has been subsequently downgraded to levels below the T-KH, it may be filed and serviced by organizations outside the System. It would seem that at least some duplicate files of this film could be purged to make room for new stacks of T-KH film, but evidently it is not being done.

e. Standard Format Files

The 12 reconnaissance film files can be considered as having internally consistent formats. Of the 95 information files, 33 of them have only one or a few different formats. These were in only four of the 13 surveyed organizations. As was the case with other files, about one third of the files in the T-KH System have internally consistent formats.

f. Manual versus Machine Files

About one third of the information files studied were machine maintained, which is about the same ratio as for files outside the System. All of the 12 film files are manual, although several studies are now in progress investigating ways of automating film storage. It should be noted here that minicard is classified as an information file although it has a capability of storing film in reduced format. Within the T-KH System, the only application of minicards is in the field of document storage despite some experimentation with its possibilities for film storage.

g. Types of Files

The breakdown of the files by type showed 69 master files, 34 derivative files, 3 duplicate files, and one suspense file. Almost 30% of the files in the T-KH world were derivative files whereas only 10% of the files outside the System were derivative files. One reason for the higher proportion of derivative files is that most of the film files are classed as derivative even though the films therein are duplicated from the original film contained in a master film file. No two of these files necessarily contain exactly the same film and therefore were not classed as duplicate files for survey purposes. From a non-technical standpoint, it should be borne in mind that these derivative files are highly duplicative in content.

h. Content Categories

In contrast with non T-KH System files, there are few abstract/extract or data files in the T-KH organizations studied. In terms of number of files, nearly half are document files and half are index files. In terms of the number of unit records, over 80% (8 million) of all the unit records are whole documents in one form or another; and, of course, most of these are the reconnaissance film files in which each frame is considered a document. There were about one and one half million index records in the files surveyed. In summary, the files picture in the T-KH organizations is one of massive documents files with a lot of relatively small index files.

i. Purpose of Files

As was the case in other files, the majority of files in the T-KH System were for regular service. However, there was a higher proportion of special project files in the System than there was outside. A breakdown of the other purposes shows:

(1) Special files (ad hoc and standing requests)   19
(2) Document accounting, security control, inventory control, requirements control and dissemination control   12
(3) Ease of update, process support, problem solving and hold for processing 5
(4) Retirement, emergency use and archival   2
(5) Frequency of search and duplicate service   2

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j.   Intended Utilization

Of the files studied, 44 were for the use of all USIB agencies, 52 serviced only the parent department, and 11 were for the sole use of the holding component. This pattern is quite similar to that for non-System files with a little higher department utilization factor but an even lower proportion of files intended for the use of all agencies.

k.   Security Classification of Files

As might be expected, the great majority of the files (96 files) were classified "Top Secret, Handle Via T-KH System Only". Only 11 of the files were classified "Secret." If the 96 files were added to the "P" category in Figure 30 in Volume II of this report, it would show that this category of file still ranks third in size but is a major category.

l.   Dissemination Controls on Files

The comments made in the body of this report on this factor apply to the files within the T-KH System in even greater degree. Almost 95% of the files surveyed had either "all" dissemination controls on them or the dissemination controls had not been determined. The only category other than "all" or "undetermined" that occurred was "No Foreign Dissem" on 9 of the files. The conclusion again is that security classification and dissemination controls on items are not being used as a criteria in file structure or file access points.

m.   Consumer Access To Files

Of the surveyed T-KH System files, 21 provided for direct access to the files by consumers, whereas 43 provided for indirect access and 43 provided for no customer access at all. The striking comparison here with files outside the System is the relatively high ratio of no consumer access, and yet 20% of the files are used directly versus 11% in non-System files.

n.   Physical Form of Files

Whereas punched cards were the most popular form for files outside the T-KH System, six files within the System, containing some 7.4 million unit records (frames) or approximately three fourths of all unit records in the 117 files surveyed, are in reel form. Reel form in non-System files ranked about 12th. Excluding the film files, the file forms for the information files ranked in popularity as follows:

Minicards: 12 files - 1,130,000 unit records
Punched cards: 16 files - 573,000 unit records
Maps, charts: 11 files - 426,000 unit records
5" x 8" cards: 15 files - 178,000 unit records
Doc, vol., page: 19 files - 150,000 unit records
Photo, frames, negatives: 6 files - 110,000 unit records
3" x 5" cards: 8 files - 76,000 unit records
Magnetic tape: 9 files - 59,000 unit records
Folder: 5 files - 25,000 unit records

Adding these to the overall community files picture shown in Figure III v 36 and 37 in the body of this report does not notably affect the total except that the "reel" form moves from 12th position to 6th in number of unit records. From a present growth-rate standpoint the file forms rank:

Film reels: 1,850,000 frames per year
Minicards: 1,050,000 cards per year
Punched cards: 456,000 cards per year
3" x 5" cards: 312,000 cards per year
5" x 8" cards: 159,000 cards per year
Documents: 84,000 docs per year
Magnetic tape: 64,000 records per year
Maps and charts: 60,000 per year
Photos, prints: 13,000 per year
Folders: 3,000 per year

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o. <u>File Order</u>

Nearly two thirds of the files and 90% of the unit records are filed in serial number order. This contrasts with only 3% of the unit records in files outside the System being filed first by serial number. Again, the reconnaissance film in reel form dictates the filing order for the bulk of the records. Subject and area ranked next in popularity as first filing order, with other criteria relatively insignificant. Without the limitations of the reel as the physical form, subject and area might be the most popular filing order.

B. INFORMATION PROCESSING PROBLEMS

As with the other worlds in the main body of this report (Volume II, Section III B), this section considers the present system in the T-KH photographic intelligence (PHOTINT) world from the view point of particular information processing problem areas as specified in the Stage I Terms of Reference. Although there are aspects of these problem areas which are unique to the photo intelligence world, the basic characteristics of the present PHOTINT IP system are similar to the systems in the SIGINT or PUBINT worlds.

1. Indexing

It is useful to consider two aspects of indexing in the PHOTINT world:

a. <u>Photography</u>

There are two requirements for indexing photography: one, to indicate the area of the earth's surface covered by the photography; the other, to record the objects which are covered The first of these requirements is usually met by a map overlay or corner coordinates of individual frames. For instance, ACIC provides

the corner coordinates for each frame of photography and a quality evaluation of some 15 segments of each frame. AFIC (now DIA) puts this information into a machine file, the Qualitative Mission Coverage Index (QMCI), out of which the photo coverage for any desired area on a geographic-coordinates basis can be obtained. The machine can also produce maps showing photo coverage by quality criteria. Aside from some duplication and lack of standard scales for map overlays in use for these indexes in the various agencies, there is not much complaint about these graphical indexes. Even so, the establishment of some standard indexing techniques for use throughout the System would result in appreciable benefits. There is much less agreement as to the method of indexing intelligence items appearing on the photography. The higher priority intelligence items are indexed as a result of the immediate reporting (OAK, IPIR, MCI, PRI), at least as far as the header information is concerned. However, there are a tremendous number of intelligence items on each exposure which are never indexed because of low priority and lack of manpower. This is a problem which has received very little attention so far by the T-KH System organizations. A good tool for portraying, publishing, or using these items is the T-KH maps prepared by AMS (see Item 9, AU 410)*. These cannot properly be called indexes, however, and the production time required is considerable.

b. <u>Information</u>

The indexing of information within the T-KH System is only partially effective. The indexing of photo interpretation reports has received more emphasis than that of collateral information, quite naturally, but even these are not thoroughly indexed. One of the more thorough jobs of indexing photo intelligence reports is that being done by NPIC in their Minicard System.

*Reference is to unpublished SCIPS survey form.

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The depth of indexing for Minicard is consider-able. The difficulty of the Minicard index is in the Minicard equipment. It is not a quick task to make a search and retrieval from Minicard re-gardless of the excellence of the indexing. At the time of the SCIPS survey there was over a year's backlog in indexing for Minicard, but it is understood that a considerable effort has since been made to eliminate the backlog. If current, this system would index all photo intelligence reports from all sources available to NPIC.

The UPIRs include many installations that are not identified but look significant or sus-picious. Out of the UPIR file at AFIC (now DIA) lists of these unidentified installations can be obtained and sent to analysts for further study and correlation with collateral data.

AFIC (now DIA) maintains an index to PI reports by target (BE number) and can list all PI reports available on each BE-numbered in-stallation.

On the collateral side, the largest effort within the T-KH System to make information available is being made by AAIA (now part of DIA) with their area cards and report summary cards (Items 2 & 9, AU 430). These cards represent extracts of information mostly from COMINT. The information contained within the System is extensive, but the depth of indexing is not great. These are entirely manual files.

The most complete combination found within the T-KH System of photo-intelligence and collateral information was in the Target Brief File of NPIC (Item G5, PU). As was true for NPIC's MCI files, however, these Target Briefs are not indexed in depth. Since they are in machine language, the prospect of indexing them in depth can be entertained.

A common indexing problem observed in all of the surveyed T-KH organizations that had automated data processing was the absence of quick specific response capabilities from the computers. This is not really so much an in-dexing problem as a limitation of the machine system. However, since the purpose of indexing is to provide access to information in files, the indexing system and the machine system should be complementary. In no case where we surveyed an automated system could they provide ad hoc counter-service on research requests. The most usual way of answering specific requests is either to refer the requestor to a tabulation previously and periodically made from the file or to run a new tabulation for him. It would be his job to find his answer from the tabulation. The AIDS System (438L) had developed a method for making direct inquires of the data base stored in the computer (IBM 7090). The method con-sisted of writing a short program to take care of each request. This, of course, took quite a long time. The method was not operational when the survey was made, but the developers thought that the time could be reduced to two to three hours per request. This, of course, is still far too long if we are to expect effective information support service from computers.

2. Data Exchange

It is useful to consider the data exchange problem in terms of the photography itself and the intelligence reports resulting from exploita-tion of the photography.

a. Photography

The method of exchanging photography with-in the T-KH System is essentially to make a copy of everything for everybody (see Figures H3 through H7). Considering the cost of film and the costs of developing, copying, transporting and storing, this is an expensive way to exchange data. Considering further that only a small amount of any one roll -- or even any one ex-posure -- contains any priority intelligence, this is an inefficient way of managing either a

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dissemination or a storage and retrieval program. Photographic missions are now so long and so frequent that most of the storage facilities within the T-KH System are fast reaching capacity. The exploitation capability within the community has long since fallen behind the raw input rate. Each mission receives a more-or-less thorough scan for highest priority targets, but each does not receive exploitation in depth. As a result, there is so much latent information on each roll of film that no holding organization wants to get rid of as much as a single roll of photography. So this method of data exchange, i.e., giving entire copies of all missions to all interested parties, could well end up at last in crowding everyone out of their buildings and still not produce the desired significant gains in exploitation. Half way between photography and reports are briefing boards. These are large annotated photos which serve as reports. There is not a complete exchange of these graphics, since many organizations prepare them for their own use and give little attention to their possible advantage to the community.

b. Reports Resulting from the Exploitation of Photography

In some respects the data exchange of formal reports within the T-KH System is like the exchange of photography, that is, sent everyone a copy of everything (for example, see Figure 118). In each of the organizations surveyed, the libraries had one thing in common, they each had copies of all of the formal PI reports turned out by the other organizations within the T-KH System. There is some exchange of machine language data within the System but, so far, not very much. Because of the close-knit nature of the T-KH System, the exchange of machine language data between organizations could be expanded relatively easily. There is much internal photo exploitation done which is never published. Many reports are produced for use within organi-

zations (notably FTD, CIA and Navy), but are not disseminated further. The fact that these studies have been made never comes to the attention of other System organizations. This results in local duplication of exploitation efforts. Like the biographic information problem discussed in Volume II, photographic exploitation is often local-use oriented; but most organizations are short on exploitation resources, and the local resolutions of information ambiguities should be made available to all.

3. Formatting

a. Photography

The format of photography may at first seem to be more of a technical problem than one of information processing. However, it leads to serious information handling problems. Some of these problems are:

(1) Different sizes of film make the manufacturing of viewing equipment very difficult. Very complex lens and projection arrangements are required if one viewer is designed to handle all film; too many machines are required if a separate viewer is built for each type film.

Some of the film sizes in use in the T-KH Systems are: 70 by 70 millimeter, 70 by 750 millimeter, 9 by 18 inches, 5 inch strip, etc. (See unpublished survey forms: IDS 48-51, PU.)

(2) Because of the difficulties above, good reliable all-purpose machines are not yet available for viewing and interpreting photography. Photo interpreters are forced to use old equipment (usually light tables and measuring tubes to scan and interpret photography), thus limiting their productivity.

(3) The practice of keeping film intact in its original roll creates another problem, again traceable to format. This is the

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difficulty a researcher has in locating his object on film. On a single exposure of KH film, hundreds of square miles of the earth's surface are imaged. Most of the area is extraneous to the researcher's needs, yet, because the area of interest has not been isolated for him, he must pick it out from all the rest. This is often a difficult procedure.

b. Report

One serious problem regarding the format of reports is the tendency to present in tabular form information which is stored in machine language.

The Mission Coverage Index produced by NPIC is an example of this, as is SAC's Photo Reconnaissance Index. The purpose of both of these reports is to notify the intelligence community of the targets covered by a new mission and to give brief information on their current status as interpreted from the photography. Both reports, however, end up serving something less than their purpose. The SAC report is published in highly formatted style with highly coded language. The coding and length (average about 100 pages) combine to make the report difficult to read. The NPIC report presents its information for each target in clear English, but the length of this report (average about 300 pages) and the repetition (the same items are reported in each consecutive report) make it almost equally uninteresting. Furthermore, the NPIC report requires an extensive manpower effort to produce, and it takes so long in preparation that the value of the information is seriously reduced by the time it reaches its customers. Both reports bear the word "index" in their title, but both serve as an index on only limited factors. The stored information on the tapes from which each are produced are far better indexes in that they can be searched for any element in the header information. The NPIC

report is indexed only by the header information that goes with each target description. This means that most of the substantive content cannot be searched automatically.

Some problems closely associated with the foregoing are: the lack of optimum means of entering information into the automated data base; the difficulty of evaluating the information against that already in the data base before entering it finally; and the failure to provide for disseminating the information rapidly in response to both general and specific inquiries after it is part of the data base.

4. Film Storage

The film storage problem is the result of high rate of input and no prospects for consolidation. The current trend in film file growth is alarming. Another problem of storing photography is the varying sizes of film. Most roll film is packaged on reels which are then put in cans. The cans most commonly in use now vary from 3 to 10 inches in height and from 5 to 9 inches in diameter, with about six sizes between these extremes. This causes great difficulty in the orderly physical arrangement of file space. Storing film on rolls and in cans is a very inefficient method, yet it is virtually the only method now in use. Cumbersome serial number search, usually manual, is required. The T-KH System has not yet developed anything to solve this problem, but several organizations have large scale experiments in progress. There is not, however, a concerted effort directed toward this problem, which is, after all, a mutual one.

C. DISCUSSION

Because a minimum of analytical effort has been applied to the survey information on the T-

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KH organizations, the following discussion must be considered no more than exploratory, however positively it may be stated. It is hoped that the discussion will stimulate further study along the avenues identified.

1. Report Formatting and Data Exchange

a. Reporting

The very early content reporting, performed by NPIC, is effective in presenting high priority information from each new mission in the relatively rapid form of OAK, IPIR and similar reports. Detailed photo interpretation reports in answer to specific requests are generally of high quality. The formal detailed reports produced by NPIC, however, take a considerable amount of time and effort in their preparation. This limits both the number of such reports, and the timeliness of the information. Another difficult problem is the systematic reporting of targets covered by each mission. This is the area presently being served by the Mission Coverage Index prepared by NPIC and the Photo Reconnaissance Index prepared by SAC. These reports are difficult and time consuming to prepare, are lengthy and hard to read, and are not the best reference tools.

The present practice within the T-KH System of reproducing copies of the film of entire missions for all organizations with an exploitation capability is very expensive in initial resources and continuing maintenance. An alternative to this practice might be to reproduce and disseminate only selected portions of the film. The selection would be on the basis of those portions of the film needed for the particular exploitation interests of a given organization.

There is a lively exchange of formal documents among the System organizations. Each organization has a complete file of the other organizations' formal reports. On the other

hand, several organizations have extremely valuable files of abstracted and evaluated information which are not shared at all or at best, are shared very sparingly. Among the latter we can note: the AAIA file or area cards and summary cards; Air Force and DIA tape files of Unifile PI reports (UPIR); Air Force tape files of Photo Reconnaissance Index Reports; FTD's files of "In House" PI reports; NPIC tape files of Target Briefs and Mission Coverage Report items. Ways should be found to combine the efforts that go into constructing these local files and others within the System, in order to create a common product which all could use to equal advantage. This product would be evaluated, abstracted/extracted information.

(1) Suggested Standard Report Format

It seems feasible that a basic report format common to all elements of the T-KH System could be developed. The purpose of this report would be a single method of reporting, referencing, storing, retrieving, and exchanging information of objects (targets) imaged by overhead reconnaissance. For ease of reference in this discussion, such a report format will be called the Standard Target Description (STD). The STD would have the following features:

(a) A separate STD would be written for any one target. The body of the STD would be short -- not to exceed four or five pages, and normally to be of one page or less -- and would be written in plain English. The header of the STD would be an encoded and formatted index with extracted information from the body of the STD, probably very much the same as the present UPIR header.

(b) It would contain a summary of the latest and best information known of a target, including both photographic and collateral information.

(c) Each STD would be prepared for and stored on magnetic tape or other media

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compatible with high speed automatic data processing equipment.

(d) A new STD would be prepared whenever a new target is identified. Revisions would be made whenever a significant change to the target has been identified.

(e) New or revised STDs would be disseminated with the same speed as presently given by OAKs to highest priority targets and only slightly less promptly for lower priority targets.

(2) Associated Reference System:

The magnetic tape record of the STDs would serve as the substance of a uniform file of all select current information on all targets. This would form the basic information file within the T-KII System and its format would be common to all organizational elements.

b. Storage and Retrieval

The storage and retrieval of film in reel form is expensive and inefficient. The alternative here, too, would be for all secondary files to store only selected portions of the film and to store it in a more manageable form than in reels. Secondary files refer to all files except the one for the original negative. That file, the primary file, should retain the original negative and one duplicate positive set in complete reel form. A physical security backup file would also, of course, have to be maintained.

The tremendous volume of stored film throughout the community could be reduced by the following practices:

(1) Produce and store only two complete sets of film, the original negative and a duplicate positive. These would be maintained by a central facility (e.g. NPIC).

(2) Produce film chips for all subsequent uses of the photography. This would include most interpretation and research uses. The initial selection of chips would be done

centrally at the time of the early reporting of a mission. This selection would be on the basis of requirements which all System organizations would establish with the central facility. The selection might be done by central facility personnel or by on-site personnel from the using organizations. The chips would be distributed by the central facility as soon as possible after the mission. The facility would have to provide rapid service to System organizations on later orders for chips; and it would have to provide precise photogrammetric measurements. The facility would have to make such measurements as a service whenever use of the original negative is demanded. The central facility also would have to service requests for reproduction in formats varying from chip size. These may include full frames and portions of rolls. Standard chip specifications would have to be determined.

(3) The retrieval system for film chips should be part of or interlocked with the system used for retrieving target description information referred to above. Perhaps a general purpose computer would be used in obtaining an address for pertinent chips at the same time it searches and retrieves on target descriptions. A search capability on a variety of criteria (subject, mission number, data, coordinator, etc.) would be required.

The idea that film chips might replace roll film as the basic medium both for storing significant photographs and for photo interpretation work is being evidenced in many places within the System. Several organizations working independently seem to be arriving at nearly the same answer: NAV PIC, SAC and FTD have arrived at the same size chip (70 by 100 mm) in their

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systems which they call MITRAN, SCRAM, and FOTECH respectively. This is not a coincidence since their chip format is essentially the same as the one developed earlier for the SAMOS program under subsystem 1. Of the three, FTD's FOTECH relies on a general purpose computer (IBM 7090) to index the information on the chips and to locate the right chips by addresses. SCRAM is still experimenting with combination computer/storage devices which are cumbersome in matching up photographic and textual information on the same target. SCRAM has developed good viewing equipment in prototype models. Much of the FOTECH equipment has yet to be produced. On paper the whole FOTECH process including scanning, printing, enlarging, viewing and final interpretation equipment as well as storage and retrieval facilities has considerable appeal. Navy's MITRAN was developed more for the storage of textual information than for photo interpretation, and at the time of the survey the photographic applications had not been worked out.

At the same time that the development of the 70 by 100 mm format is going on, other film chip experimenting is being done by other organizations. NPIC has started using cropped film positives from KH exposures to accompany its target briefs. NPIC analysts have been collecting film positive stereograms for years for use as interpretation aids and occasionally for briefings. No systematic storage and retrieval method has been worked out for these stereograms. NPIC also tried Minicard as a means of reduced storage for aerial photography, but so far it is unsatisfactory.

It might be said that the vu-graphs and film slides that are used throughout the System for briefing purposes also are related to this film storage problem, since annotated film chips could replace present projection slides and vu-graphs.

The process of initially selecting film chips from new missions for all System organizations should be worked into the early reporting procedures (OAKs, IPIRs, etc.).

A very significant by-product of a film chip storage system would be to provide pictorial tie-in with the basic target description suggested in (a) above. It could provide for a textual description of a target to be linked with stereopair film chips of the same target in a single computer search.

c. Exchange of STDs

Speculating further on a revised system, STD reports might be prepared and distributed routinely by NPIC in accordance with its mission to provide early exploitation of photography. When System organizations other than NPIC originate or revise STDs, they, too, would disseminate hard copy reports. The central facility would acquire and maintain a central tape and chip file of all STDs. In addition to the dissemination of hard copy reports by originators, the central facility would provide the other designated System organizations with copies of the pertinent portions of the tape and chip files. Transmission of the tapes and chips would be by the fastest means available. At first, this will probably mean sending them by air transport. Eventually, however, direct remote input-output facilities will probably be available which will allow for immediate automatic updating of all local files within the System.

The STD might replace the textual portions of most of the early-type PI reports such as

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OAKs, IPIRs, Sitsums, and perhaps the MCIs, PRIs and synoptic target reports such as Unifile P1 reports. It should be designed to replace as many of these as practicable. The STD reference system might also supplant present integrated photographic and collateral reference systems such as the AAIA/DIA Area and Summary Cards, and the NPIC Target Briefs. They could serve both as the basic reporting medium and the basic reference file for the entire System. As such, they would be current at all times because they would be compared, re-evaluated and, if necessary, revised whenever new information is received and exploited by any participating component.

d. Conversion of Present Holdings to STD Format

All System organizations with current files of target information of priority areas throughout the world (priority areas to be established by COMOR) would convert present file contents to STD formats. To avoid duplication this might be carried out as follows:

(1) NPIC would convert its Target Brief File to the STD format (creating the narrative body and some header information including index terms). Hopefully, the formatted header information could be obtained by machine from the AIF or UPIR files in DIA.

(2) NPIC would make the STDs available to all System organizations.

(3) Each organization would check the STDs against its own holdings, and would then prepare and disseminate new STDs for targets not included by NPIC and revise the STDs for which they may have additional significant information.

A system might be worked out by the central facility whereby the various participating organizations might be assigned geographic coverage areas to begin the conversion process, each organization taking only one area at a time and not starting one that is being worked concurrently by another organization. In this way there would be controlled overlap of effort during the conversion process.

e. System Development

The capability of establishing such a system of accepted STDs already exists in part at separate points within the System. The DIA/Air Force files have wide coverage of targets and extracted, formatted information but are not all-source. NPIC's Target Brief File has many of the needed ingredients but not formatted information nor indexing in depth nor wide enough coverage of targets. With present Electronic Data Processing (EDP) techniques and hardware it is necessary to extract, format, and usually encode information if it is to be manipulatable. The day appears far off when we can automatically process information in its natural running textual form without extracting/formatting it. There are, however, numerous techniques both in operation and under development to automatically abstract and index machine language information in varying degrees of acceptability. One such effort is within the T-KH System itself (FTD). Such a capability might be applied to the NPIC Target Brief, which is in machine readable form, and result in an adequate basic file of indexed significant information on targets. The file would have the following features:

(1) Evaluated information only
(2) Index in depth
(3) Information in plain language, but in short waste-free sentences
(4) A standard tape format enabling the search and the exchange of target briefs by means of tape exchange, teletype or other remote input devices.

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There are requirements for extracted/formatted information files (UNIFILE/AIF) versus narrative unformatted information indexed in depth, and yet the utility of the narrative is almost universally acknowledged. Thus either the two should be combined into a common community file (either physically or access-wise), or the indexed narrative might become the community standard, with formatted information files established at local option.

Other desirable characteristics of the system would be:

(1) The stored (i.e. tape, disc, drum) record for each STD would include references to all reports and all photographic materials that were used in preparing or updating it. These references need not be printed out on the STD reports but would be available for research.

(2) The unformatted portions of the STDs would be indexed in depth (probably by key words and classifications).

(3) Computers would be geared to provide on-line counter-service for ad hoc research requests on the STD files.

(4) Reconnaissance film chips could be prepared to accompany each STD. The chips would be revised as often as is necessary to reflect latest changes or better coverage. The chips for each STD would be referenced with the STD number and would be distributed with the STD when requested. Chips would be stereo-pairs whenever possible.

2. The All-Source Problem

One of the most trying problems facing the T-KH System is how to release information without compromising security to analysts in other areas of the intelligence community. A partial answer has been found in sanitization and

downgrading procedures, but these are something less than satisfactory. Other possible solutions that invite exploration are:

(a) The creation of an all-source target reference file system. All such research requests and requirements would be searched through this file regardless of the clearances of the originator. If an answer was classified too highly for the originator's clearance, then it could be sanitized. This would necessitate, of course, the establishment of an on-the-spot sanitization capability, which is where cross-system correlation is needed. The basic file proposed in Section 1, above, would lend itself, of course, to the all-source file suggested here.

(b) The sanitizing and downgrading of the AMS T-KH maps to SECRET. There is already a development along this line which would replace the photo mosaic on the maps with an air brushed replica, but this is an expensive approach. To be effective in carrying much information to analysts outside the System, the maps should be left as much intact as possible.

3. Techniques

a. Electronic Data Processing

The effectiveness of all automated reference files observed during the survey was limited by one factor, the inability to provide quick answers to specific inquiries. Evidently, the day has not yet arrived when computers can provide counter-service in the community. Because of this, the computers are flooding the System with voluminous listings of dreary information. From these, the researcher is left to find his answer and to make any further correlations. Another problem which plagues the computer operations is the slowness of getting information into ma-

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chine language. This usually involves key-punching; and whereas computers may perform in microseconds, key punching is measured in tens of seconds per card.

A specific-inquiry technique is under development at SAC and presumably at other organizations. This should be watched with great interest. A quick inquiry/response capability is the sine qua non of the basic reference file suggested in Section 1, above.

b. Technical Data

Three of the surveyed organizations are putting great effort into the computation of the exact track of satellites involved in KH photography. These tracks are then converted into precise locations and/or rectification factors for each exposure. Before the film is received in the Washington area, hasty computations are produced by AFIC (now DIA) and SAC, based on data received from tracking stations. More precise computations are made by NPIC and by AFIC after the photography is received. All three of these organizations are seeking to improve their methods so that precise information can be produced at the earliest possible time to aid initial exploitation. Consideration should be given to assigning the task entirely to one organization or to dividing it among the three.

4. Information Processing Coordination

The T-KH System has benefitted from the work COMOR performs in coordinating the interests of all the organizations by assigning priorities to targets. There is a great need for coordination in the area of information processing. There is much yet to be accomplished in the development of optimum information systems, and it is still very doubtful whether any one component is going to come up with the answers.

There is need for a group or mechanism to coordinate IP system development toward an optimum information usage program within the T-KH system. The goal of this coordination effort should be to make the processing of T-KH photography as excellent as the photography itself and, with the desired specificity of content control, to make it available to all who need it within appropriate but varying time factors.

D. THE SCIPS STUDY

The SCIPS effort in the T-KH System was hampered considerably by the security problem and by inadequate staffing with properly cleared personnel. A great majority of the field survey and analysis of the data had to be accomplished by one staff member, and he was recalled by his parent organization long before the work was finished. Two of the surveyed organizations furnished personnel to make the survey within their own organizations. These local personnel were given a short training course by SCIPS before beginning the survey. One visit by a SCIPS staff member was made about midway in the survey. The results achieved by this technique were not as satisfactory as those achieved by the SCIPS staff surveyors. However, in these two cases it was a way to get some information which otherwise would not have been obtained. Again because of the security problems, it was not practical to convert the collected data to the machined data base, and consequently there was no machine assistance in cataloging the data for analysis.

However, the surveyed organizations were more receptive of such cleared SCIPS personnel as were available than were organizations outside of the T-KH System. There was no case in which access to the organization or to information was denied. However, considerable data

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were not available simply because the organiza-
tions did not keep records of the type desired by
SCIPS.

As is pointed out in Section III - D of the
main report, the greatest amount of data result-
ing from the SCIPS effort is in the file of survey
forms and exhibits, and not in this Stage I report.
That is particularly true here because there are
no catalogs of data available as there are in sup-
port of the analyses contained in the main body of
the report. In this case, however, the forms have
not been carefully reviewed for accuracy and
completeness and care must be exercised in

their use. It would be well for any follow-on
effort to review and update the information col-
lected, and to get it into the machine data base
so that it can be made available in the same
format as the other data.

The reader should refer to Sections I-C and
III - D of the main report for further discussion
of the SCIPS study effort. The discussion therein
applies equally to this appendix. One notable
aspect of the study effort in the T-KH organiza-
tions was the frequently expressed desire of one
component to have SCIPS-type information on
counterpart components in other departments.

IV. SUMMARY AND CONCLUSIONS

In general, the findings within the T-KH Sys-
tem paralleled those of the other community
organizations that were surveyed. For this rea-
son the summary and conclusions of the body of
the report are almost equally valid for this
appendix. The most pronounced elements of the
T-KH System are treated here:

A. The T-KH System is small in terms of
organizations involved and is highly specialized.

B. It has certain problems that are unique.
These problems include:

1. Film Storage and Handling: Some
108,000 rolls of film are being distributed
to the System each year, and this has been
increasing. It is important that methods be
devised for reducing the number of copies
without denying needed photography to any
consumer. Improved methods of storage
and retrieval are paramount in the solution
of this problem.

2. Integration of Information from Photo-
graphic and Other Sources: The sensitivity
of the photo-collection systems and the spe-
cial skills required to "read" information
from photographs, as contrasted with textual
information, makes it difficult adequately to

integrate information from all sources into
the intelligence picture. A great portion of
the analysts in the intelligence community
are precluded from utilizing fully the T-KH
photographs either by lack of clearance, by
lack of ability to interpret photos, or by lack
of access to qualified photo interpreters.
Yet these same analysts are required to
reach conclusions that might be entirely
different if T-KH materials were fully ex-
ploited. Likewise, inability to call up all
available non-photo-intelligence informa-
tion hampers identification of installations
and objects that appear on photography.

3. Collection Exceeds the Exploitation
Capability: By and large, only the most
important targets covered by T-KH material
are being adequately analyzed because the
cleared analysts and photo interpreters
cannot fully cover all of the installations
and objects having potential intelligence
significance. Inability to retrieve rapidly
the available information, both photographic
and non-photographic, also contributes to
this limitation on exploitation capability.

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C. Similarly the T-KII System has strengths not generally exhibited by the rest of the community. These include:

1. Strong individual effort on the part of several of the major exploitation organizations to utilize data processing equipment to assist in reporting, storing and retrieving photo-derived information and in confirming it with other sources. Much more effort in this direction is needed, however.

2. Considerable development work is being done toward improving the method of handling film in the process of reading the information that it contains. This includes development of a standardized film format making it compatible with high-speed equipment being developed for use in filing, retrieving and interpreting photographs.

D. Like other source systems discussed in Volume 1, there is strong need within the T-KII information processing systems for:

1. Greater community attention to information processing versus collection

2. Documentation of the IP systems and thereby specification of techniques requirements

3. Common item identification

4. Common, though shallow, content control coding (4C) of photography and reports early in the process

5. Effective filtering of reporting

6. Standardized ephemeral elements of information

7. Cross-system correlation

8. A real operating success

V. RECOMMENDATIONS

A. That each of the seven recommendations given in Volume 1 of the main report be considered applicable to this appendix.

B. That the problems and conjectured solutions in Section III of this appendix be given priority consideration by the Staff as recommended in alternative "e" or "f" in Volume 1 of the main report. These problems include:

1. Standardized methods of indexing photographs and installations thereon.

2. Methods of reducing the tremendous volume of film being sent to consumers.

3. Development of standardized film chips and related equipment for storing, retrieving, interpreting, and duplication of photography.

4. Development of standard reporting techniques and formats so that all PI decisions can be reported and made available.

5. Development of methods to more successfully integrate information from T-KH and other sources.

6. Development of techniques to get photo-derived information into the hands of all who need it in the earliest possible time.

7. Reduction of duplicate computation of tracks and frame coverage as aids in processing of film.

C. That this appendix be made available to the major T-KH exploitation organizations.

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ATTACHMENT A
TABLE

Equipment of T-KH System Organizations Surveyed

	Type		Qty.
1. AU430 - Army AAIA			
a. General office equip.			
	Electric T/W		7
	Calculator		2
b. Photographic interpretation equip.			
	Stereo microscope		10
	Light table		1
	Macroscope		8
	Viewer		3
c. Duplicating and reprod. equip.			
	Book copier		1
	Copier		1
	Spirit duplicator		1
2. NU26530 - Navy Detachment, NPIC			
a. Duplicating and reprod. equip.			
	Headliner		1
	Reproducer		1
3. AU2130 - Army Detachment, NPIC			
a. Duplicating and reprod. equip.			
	Spirit duplicator		1
	Photocopy machine		1
	Punching machine		3
	Copier		1
	Offset press		2
	Photostat		1
	Press		2
	Accessory		11
b. Photographic interpretation equip.			
	Micro projector		1
	Photomicrograph		1
	Stereo macroscope		45
	Light table		64
	Stereo microscope		49
	Stereo comparagraph		1
	Film reading sys.		7
	Viewer		3
c. Photographic mensuration equip.			
	Comparator		1
	Oscilloscope		1
	Rectifier sng.		1
d. Photographic laboratory equip.			
	Printer		8
	Copy camera		1
	Planetary camera		1
	Developing unit		2
	Editor		1
	Enlarger		4
	Chemical mixer		7
	Dryer		3
	Processor		9
	Screen		2
	Sensitometer		1
e. General office equip.			
	Justowriter		4
	Calculator		3
	Varitype		5

25X1

25X1

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SCIPS I-VI H

(Continued)

	Type		Qty.	25X1
4. FU220 - Air Force Element, NPIC				
a. Photographic interpretation equip.				
	Stereo microscope		1	
5. FL11 - Research Center, SAC				
a. Photographic interpretation equip.				
	Viewer		15	
	Micro-projector		6	
	Stereo microscope		38	
	Light table		39	
	Scope camera		2	
	Macroscope		67	
	Scanning stereoscope		7	
b. EAM equip. & machine language input.				
	EAM equip.		1	
	EAM equip.		1	
	EAM equip.		1	
	EAM equip.		1	
	EAM equip.		1	
	EAM equip.		5	
	Binding machine		1	
	Punching machine		1	
	EAM equip.		1	
	EAM equip.		1	
c. Duplicating and reprod. equip.				
	Ozalid machine		1	
	Copy machine		2	
	Transpaque projector		1	
d. EDP equip.				
	Card to tape converter		1	
	Computer		1	
	Telereadex		1	
	Telecordex		2	
	Computer*			
e. General office equip.				
	Typewriter		38	
	Calculators		7	
	Flexowriter		4	
f. Photographic mensuration equip.				
	Electroplotter		3	
	Comparator		1	
	Coordinatograph		2	
g. Photographic laboratory equip.				

Similar in capability and size to NPIC (see item 9d, below). Exact figures were not obtained in survey.

	Type		Qty.	25X1
6. FU2310 - AFIC (now part of DIA)				
a. EDP equip.				
	Digital voltmeter (computer)		1	
	Computer*		1	
	Computer*		1	
b. Duplicating and reprod. equip.				
	Autostat		1	
	Thermofax		1	
	Ozalid		1	
	Projectors		3	
	Accessory		3	

*Available under special procedures outside T-KH Center

25X1

SCIPS I-VI H

(Continued)

	Type	Mfg.	Model No.	Qty.

c. Photographic laboratory equip.

Similar in size and capability to NAV PIC (see item 10c, below). Exact figures were not obtained in survey.

d. Photographic interpretation equip.

Type	Qty.
Viewers	10
Light tables	101
Stereo microscopes	23
Stereoscopes	33
Macroscopes	23

e. General office equip.

Type	Qty.
Typewriters	19
Calculators	2
Accessory	2

f. Photographic mensuration equip.

Type	Qty.
Comparator	1

7. FU612 - Foreign Technology Division
   a. EAM equip. & machine language input.

b. EDP equip.

Type	Qty.
Card punch	2
Computer*	

c. Duplicating and reprod. equip.

Type	Qty.
Autostat	
Thermofax	
Accessory	9

d. Photographic laboratory equip.

Similar in size and capability to NAV PIC (see item 10c, below). Exact figures were not obtained in survey.

e. Photographic interpretation equip.

Similar in size and capability to AFIC (see item 6d, above). Exact figures were not obtained in survey.

f. Photographic mensuration equip.

Similar in size and capability to DESPA (see item 13d, below). Exact figures were not obtained in survey.

g. General office equip.

Type	Qty.
Typewriter	4
Calculator	1
Accessory	4

8. CU2330 - CIA ORR
   a. Photographic interpretation equip.

Type	Qty.
Viewer	8
Stereo microscope	7
Light table	6

b. General office equip.

Type	Qty.
Typewriter	4
Calculator	1
Accessory	1

9. PU - National Photographic Interpretation Center
   a. EAM equip.

Type	Qty.
Decollator	1
Imprinter - detach	1
Detacher	1
Key punch	6
Verifier	8
Collator	8
Sorter	1
Statistical mach.	1
Accounting mach.	1

*Available under special procedures outside T-KH Center

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(Continued)

	Type	Mfg.	Model No.	Qty.
	Doc. orig. mach.			1
	Interpreter			1
b. EDP equip.				
	Computer			1
	Printer			1
	Tape drive			4
	Card reader			1
	Card/tape-tape/card			1
	Minicard selector			1
	Minicard filing sorter			2
	Minicard stick			100
	Minicard cabinets			10
	Minicard strip film holders			10
	Minicard processing machine			2
	Minicard inspection viewer			2
	Minicard mask printer			2
	Minicard film waxer			2
	Minicard film cutter			1
	Minicard aerial photo camera			1
	Minicard opaque camera			1
	Minicard duplicator			2
	Minicard enlarger and processor			1
	Computer			1
	Central processor			1
	Tape units			8
	Printer			1
	Reader			1
	Punch			1
	Drum unit			1
	Paper tape unit			1
	Scanner/reflector			1
	Probe			8
c. Duplicating and reprod. equip.				
	Reflecting proj.			1
	Offset press			5
	Ozalid			3
	Photostat			3
	Folder			1
	Collator			2
	Binder			1
	Paper drill			1
	Stapler			1
	Sticker			1
	Cutters			2
	Thermofax			3
	Dryer			1
d. Photographic laboratory equip.				
	Printers			10
	Developers			1
	Enlargers			9
	Duplicators			2
	Vacuum frames			2

25X1

25X1

SCIPS I-VI H

25X1

(Continued)

Type	Qty.
Copy camera	1
Microfilm camera	1
Processors	12
Dryer	5
Transformer, printer, rectifier	1

e. Photographic interpretation equip.

Type	Qty.
Viewers	18
Viewing tables	4
Light tables	104
Stereo microscope	54

f. Photographic mensuration equip.

Type	Qty.
Densitometer	2
Stereo comparator	8
Electronic plotter	2
Point transfer	1
Dual screen comparator	1
Projection comparator	1
Stereo plotter	1
Camera calibrator	2
Goodehe survey kit	1

g. General office equip.

Type	Qty.
Cable equip.	3
Cable equip.	3
Teletype	3
Typewriter	84
Rotary drum file	3
Elevator file	1
Flexowriter	8
Justowriter	4
Varitype	2
Headliner	4
Calculator	7

25X1   10.

a. EAM equip.

b. EDP equip.

Type	Qty.
Key punch	1
Computer	1
Data retrieval viewer	1
Telecordex	1

c. Photographic laboratory equip.

Type	Qty.
Processor	7
Titlers	2
Cleaners	2
Waxers	2
Printers	7
Enlargers	4
Copy cameras	2
Inspection and quality control kit	1

d. Photographic interpretation equip.

Type	Qty.
Light tables	15
Stereo microscope	15
Magnifying viewer	1
Electronic analog Rectifier	2
Viewers	2
PI kits	25

e. Photo mensuration equip.

Stereo compilation

25X1

25X1

	Type		Qty.
	(Continued)		
	instruments		5
	Automatic plotter		1
g. General office equip.			
	Flexowriter		1
11. CU200 CIA/PID/LnSt.			
a. Duplicating and reprod. equip.			
	Thermofax		1
	Projector		1
	Spirit duplicator		1
b. Photographic interpretation equip.			
	Light table		2
	Viewer		1
	Stereo microscope		4
12. CU20 CIA/PID (NPIC Detach)			
a. Photographic interpretation equip.			
	Light tables		43
	Light tables		7
	Viewer (cut film)		11
	Viewer projection		1
	Stereo microscopes		61
b. Duplicating and reprod. equip.			
	Thermofax		1
c. General office equip.			
	Typewriters		9
	Calculators		2
13. AU410 Army Map Service/DESPA			
a. Duplicating and reprod. equip.			
	Offset press		1
	Paper cutter		1
b. Photographic interpretation equip.			
	Viewer		8
	Stereo viewers		2
	Stereo microscope		5
	Macroscope		28
	Light tables		20
	Reflecting projector		1
c. Photographic mensuration equip.			
	Optical rectifier		3
	Electronic rectifier		1
	Stereo plotters		4
	Automatic plotters		1
d. EDP equip.			
	Computer		1
	Tape punch		1
	Tape reader		1
e. Photographic laboratory equip.			

Similar in size and capability to NPIC (see item 9d above).

14. KU10 DIA/SAO			
a. EAM equip.			

25X1

	Type		Qty.
	Keypunch		3
	Paper tape punch		1
	Card sorter		1
	Paper tape dispenser		1
b. General office equip.			
	Typewriter		26
	Time stamp		2
	Teletype		1
c. Duplicating and reprod. equip.			
	Thermofax		2
	Projector		1

25X1

TOP SECRET